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EXAMINER				
BAYOU, AMENE SETEGNE				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/576,783

**Applicant(s)**

KATAYAMA ET AL.

**Examiner**

AMENE S. BAYOU

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11/02/10.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 5-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-945)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 6-10, 11 and 12 are rejected under 35 U.S.C 103(a) as being unpatentable over Katayama (Japanese patent publication number 2003065236) in view of Wantanabe ( 5076226).

3. In re claims 1, 6, 8, 11 and 12 Katayama discloses a compression system including:

- A **hermetic compressor (figure 1)** storing oil in a hermetic container and accommodating a compression mechanism for compressing refrigerant gas, wherein the compression mechanism comprises: a crank shaft disposed in vertical direction, and having a **main shaft (9)** and an **eccentric shaft (10)** ,a block forming a **cylinder (13)** ,a **piston (23a)** making a reciprocating motion in the **cylinder (13)** , and having a top surface and a skirt surface, both vertical to a direction of the reciprocating motion, a **connecting rod (11)** for coupling the **eccentric shaft (10)** and the **piston (23)** , and an **oil supply system (7c)** for supplying the oil to an outer circumference of the piston (**see abstract**) , **grooves (23e)** are provided at an upper side and a lower side of the outer circumference of the piston, and of an outer shape of the grooves, the outer shape of the

grooves communicating with a space in the hermetic container at least when the piston is in a bottom dead center is a shape not forming a parallel line to an axial center of the piston when the grooves are developed in a plane (**clearly shown in figure 5 and discussed in abstract**), wherein a **through-hole** is disposed at about the center of the grooves (**figure 5**). Katayama, however fails to disclose the following details of the grooves as taught by Watanabe et al :

- The **outer shape of the grooves (28 and 328; figure 2,4,9)** is a **contiguous semicircular shape (column 3, lines 5-9; column 4, lines 6-18)** extending toward a skirt side of the piston, and the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape, and a curvature of the first outer shape is smaller than that of the third outer shape (**figures 2,4,9 and 12 are different embodiments describing various shapes with different curvatures**). It would have been obvious to one skilled in the art at the time the invention was made to modify the piston grooves of Katayama by making them in a contiguous semicircular fashion as taught by Watanabe et al to increase the area of lubrication. Please note that once modified the grooves of Katayama communicate with the space in the hermetic compressor.

4. In re claim 2 Katayama in view of Watanabe et al as applied to claim 1 discloses the claimed invention:

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Katayama discloses:

- All of the outer shape of the grooves (23e) are shapes not forming the parallel line to the axial center of the piston when the grooves are developed in a plane, in figure 5.

5. In re claim 3 Katayama in view of Watanabe et al as applied to claim 1 disclosed the claimed invention but is silent as to how much the depth of the groove is. But it would have been obvious to one skilled in the art at the time the invention was made to choose the proper dimension of the grooves since such choice merely depends on the size of the compressor ,the degree of lubrication required and the flow rate of the lubricant that the designer chooses.

6. In re claims 6 and10 Katayama in view of Watanabe et al discloses the claimed invention:

Katayama discloses:

- A hermetic compressor ,in figure 1, storing oil in a hermetic container and accommodating a compression mechanism for compressing refrigerant gas, wherein the compression mechanism comprises: a crank shaft disposed in vertical direction, and having a main shaft (9) and an eccentric shaft (10) ,a block forming a cylinder ,a piston (23a) making a reciprocating motion in the cylinder (13) , and having a top surface and a skirt surface, both vertical to a direction of the reciprocating motion, a connecting rod (11) for coupling the eccentric shaft (10) and the piston (23), and an oil supply system (7c) for supplying the oil to an outer circumference of the piston (see abstract), grooves (23e) are provided at

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an upper side and a lower side of the outer circumference of the piston, wherein a through-hole is disposed at about the center of the grooves (figure 5).

Watanabe et al teach:

- The **grooves (28 and 328;figure 2,4,9)** include a first portion extending toward a skirt side and a second groove portion extending toward a top side of the piston ,**The first and second groove portions (28 and 328;figure 2,4,9)** having **contiguous semicircular shape (column 3,lines 5-9;column 4,lines 6-18)**. Please note that once modified the grooves of Katayama communicate with the space in the hermetic compressor.

7. In re claims 7 and 9 Katayama in view of Watanabe et al discloses the claimed invention since Watanabe et al's various embodiments (such as figure 9) clearly disclose that the outer shape of the groove including the first outer shape, the second outer shape and the third outer shape is a curved shape to be gradually increase in sliding width toward the skirt direction of the piston.

8. In re claim 11 Katayama in view of Watanabe et al discloses the claimed invention:

Katayama discloses:

- A hermetic compressor ,in figure 1,storing oil in a hermetic container and accommodating a compression mechanism for compressing refrigerant gas, wherein the compression mechanism comprises: a crank shaft disposed in vertical direction, and having a main shaft (9) and an eccentric

shaft (10) ,a block forming a cylinder ,a piston (23a) making a reciprocating motion in the cylinder (13) , and having i)a top surface and a skirt surface, both vertical to a direction of the reciprocating motion and II ) a through hole , a connecting rod (11) for coupling the eccentric shaft (10) and the piston (23), and an oil supply system (7c) for supplying the oil to an outer circumference of the piston (see abstract),grooves (23e) are provided at an upper side (or a lower side) of the outer circumference of the piston

Watanabe et al teach:

- **Grooves (28,328)** are provided at an upper and a lower side of the outer circumference of the piston; **The outer shape of grooves (28 and 328;figure 2,4,9) is contiguous semicircular shape (column 3,lines 5-9;column 4,lines 6-18) extending toward the skirt side of the piston**, and the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston , and a third outer shape linking the first outer shape and the second outer shape, and a curvature of the first outer shape is smaller than that of the third outer shape (**figures 2,4,9 and 12 are different embodiments describing various shapes with different curvatures**) .Please note that once modified the grooves of Katayama communicate with the space in the hermetic compressor when the piston is at BDC and the grooves do not form a parallel line to an axial center of the piston (please refer to the annotated drawing below).Please also note that since the grooves Watanabe et al are

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in a circular or semicircular fashion once modified the grooves will encompass (encircle) the through hole of Katayama.

9. In re claim 12 Katayama in view of Watanabe et al discloses the claimed invention:

Katayama discloses:

- A hermetic compressor ,in figure 1, storing oil in a hermetic container and accommodating a compression mechanism for compressing refrigerant gas, wherein the compression mechanism comprises: a crank shaft disposed in vertical direction, and having a main shaft (9) and an eccentric shaft (10) ,a block forming a cylinder ,a piston (23a) making a reciprocating motion in the cylinder (13) , and having a top surface and a skirt surface, both vertical to a direction of the reciprocating motion, a connecting rod (11) for coupling the eccentric shaft (10) and the piston (23), and an oil supply system (7c) for supplying the oil to an outer circumference of the piston (see abstract), grooves (23e) are provided at an upper side (or a lower side) of the outer circumference of the piston, wherein a through-hole is disposed at about the center of the grooves (figure 5), a sliding surface is provided all around a skirt side of the piston.

Watanabe et al teach:

- **Grooves (28,328)** are provided at an upper and a lower side of the outer circumference of the piston; **The outer shape of grooves (28 and 328; figure 2,4,9) is contiguous semicircular shape (column 3, lines 5-9; column 4, lines 6-18) extending toward the skirt side of the piston, and**



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the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape, and a curvature of the first outer shape is smaller than that of the third outer shape (**figures 2,4,9 and 12 are different embodiments describing various shapes with different curvatures**). Please note that once modified the grooves of Katayama communicate with the space in the hermetic compressor when the piston is at BDC and the grooves do not form a parallel line to an axial center of the piston (please refer to the annotated drawing below).

10. Claim 5 is rejected under 35 U.S.C 103(a) as being unpatentable over Katayama (Japanese patent publication number 2003065236) in view of Wantanabe ( 5076226) as applied to claim 1 further in view of Irino ( 5092747).

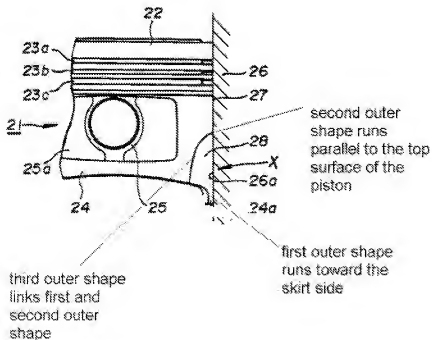
11. In re claim 5 Katayama discloses the claimed invention but fails to teach a CFC-12 type of refrigerant. But Irino in paragraph 1, lines 32-34 teaches that hydrocarbon refrigerants are widely used in refrigerant compressor. It would have been obvious to one skilled in the art at the time the invention was made to choose a CFC-12 or other hydrocarbon as refrigerant since it is one of the most commonly used refrigerant in the field.

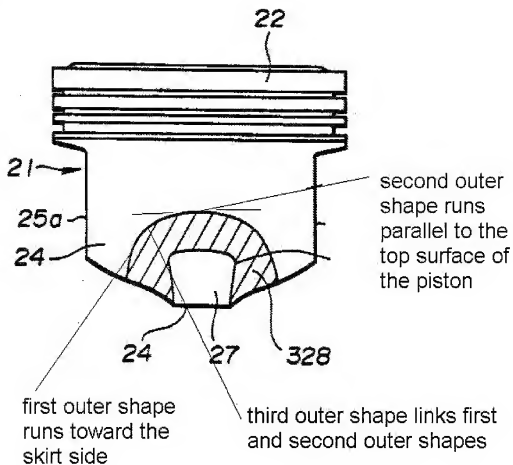
***Response to Arguments***

12. Applicant's arguments with respect to claims 1-3 and 5-10 have been considered but are not persuasive.

13. Regarding claim 1 Applicants on page 4 paragraph 1 argued that Grooves 28 and 328 of Wantanbe et al. do not show a second outer shape parallel to the top surface of the piston and also asserted that same grooves fail to show a third outer shape linking the first outer shape and the second outer shape. Examiner respectfully disagrees.

Similar to the limitation of claim 1, Wantanbe in **column 3, lines 5-9; column 4, lines 6-18** clearly stated that both grooves 28 and 328 are fashioned in a semicircular way to facilitate supply of oil to the piston surface. The figures reproduced below also clearly illustrate that the grooves essentially comprise 3 shapes similar to Applicants' invention.





As shown in the annotated figures above a curvature of the first outer shape is smaller than that of the third outer shape.

***Conclusion***

14. **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amene S. Bayou whose telephone number is 571-270-3214. The examiner can normally be reached on miff attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR

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